TABLE OF CONTENTS

INVITED PAPERS BY TOPIC

I. NONLINEAR AND NON-GAUSSIAN DYNAMIC MODELS

Organizer: CRAIG F. ANSLEY, University of Auckland
Chair: RUEY S. TSAY, Carnegie Mellon University

The Nonparametric Estimation of Growth Curves. ROBERT KOHN, University of New South Wales; CRAIG F. ANSLEY, University of Auckland 1

Non-Gaussian State Space Modeling of Time Series. GENSHIRO KITAGAWA, Institute of Statistical Mathematics 6

Discussion. B. ABRAHAM, University of Waterloo; A. THAVANESWARAN, University of Manitoba 16

II. DYNAMIC STATE ESTIMATION AND SYSTEM IDENTIFICATION

Chair/Organizer: JOHN L. MARYAK, Johns Hopkins University

Parameter Estimation and Uncertainty Calculation in the Presence of Uncertain Nuisance Parameters: An Application to State-Space Models. JAMES C. SPALL, Johns Hopkins University 18

Discussion. HIROKI TSURUMI, Rutgers–The State University 23

III. RECENT DEVELOPMENTS IN DIAGNOSTICS

Organizer: R. DENNIS COOK, University of Minnesota
Chair: SANFORD WEISBERG, University of Minnesota

Perturbation Scheme Specific Residuals. R. SCHALL, T. T. DUNNE, Institute for Biostatistics, MRC 25

Fuzzy Quantile-Quantile Plots for Multivariate Data. GEORGE S. EASTON, ROBERT E. McCULLOCH, University of Chicago 30

IV. MAKING STATISTICS MORE EFFECTIVE IN SCHOOLS OF BUSINESS

Chair/Organizer: GEORGE C. TIAO, University of Chicago

Cross-Disciplinary Research and Teaching Between Statistics and Marketing. HARRY V. ROBERTS, University of Chicago 40

V. UNIT ROOTS IN TIME SERIES: BAYESIAN SOLUTION

Chair/Organizer: JOHN F. GEWEKE, Duke University

The Posterior Distribution of Roots in Multivariate Autoregressions. JOHN GEWEKE, Duke University 44

Modeling Trends. CHRISTOPHER A. SIMS, University of Minnesota 54

Trends and Cycles as Unobserved Components in Real GNP: A Bayesian Perspective. DAVID N. DEJONG, University of Pittsburgh; CHARLES H. WHITEMAN, University of Iowa 63

On "Unit Root Econometrics": Discussion of Geweke, Sims, and DeJong and Whiteman. FRANCIS X. DIEBOLD, University of Pennsylvania 71

VI. OUTLIERS IN TIME SERIES ANALYSIS

Chair/Organizer: BOVAS ABRAHAM, University of Waterloo

Random Level Shift Time Series Models. CHUNG CHEN, Syracuse University; GEORGE C. TIAO, University of Chicago 75

Comparison of Parameter Estimation Methods in Time Series With Outliers: A Simulation Study. ALICE CHUANG, Bowling Green State University; BOVAS ABRAHAM, University of Waterloo 83

VII. STOCK MARKET VOLATILITY

Chair/Organizer: G. WILLIAM SCHWERT, University of Rochester

Modeling Stock Market Volatility Changes. DANIEL B. NELSON, University of Chicago 93

VIII. STATISTICAL ANALYSIS OF SCANNER DATA

Chair/Organizer: PETER E. ROSSI, University of Chicago

A Consumer Choice Model With a Non-purchase Option. JEONGWEN CHIANG, University of Rochester 99

CONTRIBUTED PAPERS BY TOPIC

I. MULTIVARIATE TIME SERIES MODELING

Chair: GRETA M. LJUNG, Massachusetts Institute of Technology

Forecasting With Vector Autoregressive Models. ELIZABETH L. ROSE, University of Southern California 104

Forecasting With Bayesian Vector Autoregressions. K. RAO KADIYALA, Purdue University; LARS SUNE KARLSSON, Stockholm School of Economics 110

Assessing Transit Marketing Changes by Using Multivariate ARMA Models. GREG M. LEPAK, JOHN J. CONSIDINE, Le Moyne College 116

A Model for the Water Current in the St. Lawrence Estuary. G. BÉGIN, Université du Québec à Montréal; A. LATOUR, Université du Québec à Montréal and Université Paris IX, Dauphine; J.-P. CHANUT, M. I. EL-SABH, Université du Québec à Rimouski 120

II. ROBUST ESTIMATION

Chair: RUSSELL V. LENTH, University of Iowa

Measures of Peakedness and Tail-Length of a Distribution. KHURSHEED ALAM, Clemson University; AMITAVA MITRA, Auburn University 126

Robustness to Non-normality of Standard Regression Tests. SUBHASH C. SHARMA, Southern Illinois University; M. M. ALI, University of Kentucky 132

Robust Regression Based Discriminant Analysis: the Diagnosis of Disease and the Classification of Students. MOUTAZ KHOUJA, KWANGSEEK CHOE, DAVID E. BOOTH, Kent State University 137

A Note on the Robustness of Parametric and Nonparametric ANCOVA Against Conditional Non-normality in Very Small Samples. SAMUEL L. SEAMAN, DEAN M. YOUNG, KRIS K. MOORE, Baylor University 142

III. ECONOMIC MODELING I

Chair: GERALD SCHLUTER, U.S. Department of Agriculture

Measuring Trade in Advanced Technology Products. THOMAS ABBOTT, ROBERT McGUCKIN, PAUL HERRICK, LEROY NORFOLK, U.S. Bureau of the Census 146

How to Sentence a Corporation for Price-Fixing Offenses? An Unresolved Problem. CHAIHO C. WANG, ICF Consulting Associates 152

Executive Compensation and the Goals of Firms. ANDREW W. BRAUNSTEIN, Iona College 158

Fiscal Policies and County Population Growth in the South. ROBERT D. DEAN, CYRIL F. CHANG, Memphis State University 161

A Comprehensive Input-Output Analysis of the Impact of Substantial Utility Rate Increases on Household and Business Activity. M. RAY PERRYMAN, FRANK J. WYMAN III, Baylor University 163

IV. RECENT DEVELOPMENTS IN SURVEYS AND ISSUES OF DATA QUALITY

Chair: NANCY J. KIRKENDALL, Energy Information Administration

Recent Changes in the White Collar Pay Survey. T. BURDETTE, S. COHEN, C. COOPER, Bureau of Labor Statistics 168

A Survey on the Temporary Help Supply Service. PENNY L. ASBURY, Bureau of Labor Statistics 174

Integrating the Employment Cost Index and the Employee Benefits Survey. JACQUELINE A. RICHTER, Bureau of Labor Statistics 178

Statistical Reliability in China. JEFFREY R. TAYLOR, Willamette University; JUDITH BANISTER, U.S. Census Bureau 184

V. STATISTICAL METHODS IN FINANCE

Chair: ANDREW F. SIEGEL, University of Washington

Bond Yield Peaks: A Liquidity Preference Model. HENRY G. RENNIE, University of Toledo 190

Estimation of the Yield Curve: A Comparison of Alternative Techniques. SIMON POWER, Carleton University 196

Federal Deficit and Interest Rate Yields. RICHARD J. CEBULA, Emory University 201

Fitting Parameters of the U-Shaped Model by Maximizing the Canonical Correlation Between Successive Sets of Functions of Residuals. PURNELL H. BENSON, Rutgers–The State University 204

VI. TOPICS IN TIME SERIES ANALYSIS

Chair: JONATHAN D. CRYER, University of Iowa

Nonstationary Time Series Analysis by Piece-Wise Stationary AR Modeling. WALLACE E. LARIMORE, JAMES L. CANTOR, DANIEL J. CHAPMAN, VÁCLAV MAJER, Computational Engineering, Inc. 210

Counterexamples to Parsimony and BIC. DAVID F. FINDLEY, U.S. Bureau of the Census 216

Exact Moments of the Least Squares Estimator in a First-Order Non-stationary Autoregressive Model. ALBERT K. TSUI, National University of Singapore; M. M. ALI, University of Kentucky 220

On the Exact Distribution of Certain Test Statistics for the Random-Walk Hypothesis. M. W. LESLIE CHANDRAKANTHA, J. S. MEHTA, Temple University; P. A. V. B. SWAMY, FRANCIS X. DIEBOLD, Federal Reserve Board 226

On a Measure of Dissimilarity Between ARIMA Models. DOMENICO PICCOLO, University of Naples 231

VII. ISSUES IN FORECASTING

Chair: WILLIAM W. S. WEI, Temple University

Forecasting Circuit Counts for Special Services. JACK C. LEE, NABIL A. AHMED, S. CRYSTAL HORNG, Bellcore 237

Time Series Perspectives on Federal Budgetary Aggregates. MACK C. SHELLEY II, Iowa State University 243

Forecasting the Level of Economic Activity Using ARMA Models. NADER NAZMI, Lake Forest College; PAUL NEWBOLD, University of Illinois 248

Computational Methods for Forecasting Models: Canned Programs vs. Spreadsheet Programs. FRED HULME, KRIS MOORE, Baylor University 254

Is the Regression Forecasting Practice Practical? ELLIOT LEVY, Reston, Virginia 258

VIII. ISSUES IN EMPLOYMENT AND PERSONNEL SELECTION

Chair: JOHN W. RUSER, Bureau of Labor Statistics

Gender Differences in Perceived Health Hazards at Work. JOHN G. MARCIS, University of Missouri–Columbia; GAIL L. GILL, Ohio State University; ALAN B. DECK, University of Southwestern Louisiana 264

The Labor Market Position of Hispanic, Black, and White Youths, 1973–1986. SOON PAIK, U.S. Department of Labor 270

Wages and the Risk of Plant Closing: Estimates From Census Microdata. TIMOTHY DUNNE, U.S. Census Bureau; MARK J. ROBERTS, Pennsylvania State University 275

Effects of Individual Response Bias on Job Preferences. JOAN G. HAWORTH, CHARLES T. HAWORTH, Florida State University 281

Heteroskedasticity in Personnel Selection Models. MARTIN SELZER, DOUGLAS JONES, Rutgers–The State University 287

IX. ERRORS IN VARIABLES AND MULTICOLLINEARITY IN REGRESSION

Chair: BERT M. STEECE, University of Southern California

A Modification of the Usual Estimators for the Multivariate Errors-in-Variables and Factor Analysis Models. YASUO AMEMIYA, Iowa State University 293

Orthogonal Distance Regression and the Errors-in-Variables Problem. JOHN H. HERBERT, CHETHA PHANG, Energy Information Administration 298

Resampling Fuzzy Data and Latin Squares: Improving Inference in Small Sample Regressions. H. D. VINOD, Fordham University 304

Selection of the Biasing Parameter in Ridge Regression. XIN XIN HE, JACK C. HAYYA, Pennsylvania State University 310

Another Look at the Effects of Collinearity in Regression Analysis. STEVEN S. CARROLL, DANIEL G. BROOKS, Arizona State University 316

A Bayesian Analysis of Collinear Data—The Case of Translog Function. EHSAN S. SOOFI, University of Wisconsin–Milwaukee; ABDOL S. SOOFI, University of Wisconsin–Platteville 321

X. ECONOMIC MODELING II

Chair: FRANCIS X. DIEBOLD, Federal Reserve Board

Statistical Analysis of Medical Malpractice Costs: Analysis of Incident Reporting Times. ARNOLD R. MILLER, EDWARD P. RICHARDS III, University of Denver 327

Predicting the Frequency of a Physician's Future Medical Malpractice Claims. BRUCE COOIL, Vanderbilt University 331

Real Business Cycles: Sector Analysis. ROBERT D. DEAN, CALDWELL DANIEL III, Memphis State University 335

Sectoral Disequilibrium and Macroeconomic Stabilization Policies. T. V. S. RAMAMOHAN RAO, Indian Institute of Technology; SARASWATI P. SINGH, University of Alberta 339

Contrasting Approaches to Socio-Economic Statistics in East and West. OTHMAR W. WINKLER, Georgetown University 345

XI. STATE SPACE MODELS AND ISSUES IN TIME SERIES ANALYSIS

Chair: GREGORY C. REINSEL, University of Wisconsin

Isolating Modeling Errors in the Parameters of a State-Space Model. MARK S. ASHER, JOHN L. MARYAK, Johns Hopkins University 351

Some Preliminary Results on Computable Berry-Esseen Bounds for Maximum Likelihood Estimates. JOHN L. MARYAK, JAMES C. SPALL, Johns Hopkins University 357

A Study on a Period Estimator by a Bootstrap Procedure. MARCELLA CORDUAS, University of Naples 362

XII. STATISTICAL SAMPLING IN AUDITING

Organizer: RICHARD W. ANDREWS, University of Michigan
Chair: ALAN ROSHWALB, Georgetown University

Calibration of Auditing Models Using Expert Judgement. H. TAMURA, University of Washington 368

A Bayesian Model of the Audit Process. RICHARD W. ANDREWS, University of Michigan; T. M. F. SMITH, Southampton University 374

XIII. INVESTMENT AND PORTFOLIO ANALYSIS

Chair: PETER A. ZADROZNY, Federal Reserve Bank of Atlanta

Nonparametric Prediction of Asset Returns: Further Negative Results. F. X. DIEBOLD, University of Pennsylvania; R. M. SELLA, Federal Reserve Board 380

Beta Instability: Implications for Forecasting Stock Returns. JOHN C. G. BOOT, State University of New York at Buffalo; YUEH H. CHEN, National Sun Yat-sen University; WINSTON T. LIN, State University of New York at Buffalo 385

Robust Estimates of Security Risk: Comparison of the Arch and the Nonparametric Estimates—The Case of Individual Public Utilities. PREM P. TALWAR, University of Alberta 391

XIV. MISSING OBSERVATIONS AND OUTLIERS IN TIME SERIES ANALYSIS

Chair: JOHANNES LEDOLTER, University of Iowa

Outliers and Missing Observations in Time Series. GRETA M. LJUNG, Massachusetts Institute of Technology 397

Outlier Detection in Time Series. J. PETER BURMAN, University of Kent 402

Evaluation of Kalman Filter Implementations of Exponential Smoothing With Outlier and Level Shift Detection. NANCY J. KIRKENDALL, Energy Information Administration 408

Effects of Outliers on the Cross Correlation Function in Transfer Function Models. DANTE A. VERME, George Washington University 414

XV. TESTS OF NORMALITY AND ISSUES IN ANALYSIS OF VARIANCE

Chair: PAUL S. HORN, University of Cincinnati

Nonconstant Variances in Mixed Linear Models. CHUL H. AHN, CNA Insurance Companies 418

Singular Value Decomposition of Design Matrices in ANOVA With Balanced Data. TOM WANSBEEK, University of Groningen 422

Measurement Variation Between Analog and Digital Equipment. CEYHUN OZGUR, Valparaiso University; GARY E. MEEK, University of Akron 425

Bivariate Extensions of the Boxplot. K. GOLDBERG, Wyeth-Ayerst Research; B. IGLEWICZ, Temple University 430

XVI. ISSUES IN ECONOMETRICS

Chair: EDWARD C. KOKKELENBERG, University of New York

A Test for Weak Exogeneity in Qualitative Models. SHUBHA GHOSH, University of Texas at Austin; PANKAJ GHOSH, University of the District of Columbia 436

Finite Sample Properties of the Single Equation Estimators Under Structural Change. JIRO HODOSHIMA, Nanzan University 440

U.S. Productivity: Results From a Production Model. HONG V. NGUYEN, University of Scranton 445

Nonlinear Regression for Estimating a Quadratic Expenditure System. HWANG JAW LEE, WEN S. CHERN, Ohio State University 448

Econometrics and Production Functions. ROBIN ROWLEY, McGill University; RENUKA JAIN, Worcester State College 454

XVII. TIME SERIES ANALYSIS AND FORECASTING

Chair: MARK C. OTTO, U.S. Bureau of the Census

Time Series Forecasting: An Application to Rainfall Data for Utility District Water Management. I. C. CHANG, M. M. WHITESIDE, University of Texas at Arlington 459

Benchmarking of Economic Time Series. NORMAND LANIEL, KIMBERLEY FYFE, Statistics Canada 462

Applications of Locally Weighted Regression to Time Series Decomposition. STUART SCOTT, Bureau of Labor Statistics 467

Current-Trend-Level Estimation: A Dead-End Street? GUY HUOT, Statistics Canada 473

XVIII. STATISTICAL METHODS IN MARKETING RESEARCH

Chair: ALAN E. GELFAND, University of Connecticut

Shrinkage Estimation of Price and Promotional Elasticities. ROBERT C. BLATTBERG, EDWARD I. GEORGE, University of Chicago 478

The Use of Biased Predictors in Marketing Research. R. CARTER HILL, Louisiana State University; PHILLIP A. CARTWRIGHT, JULIA F. ARBAUGH, Nielsen Marketing Research 484

The Empirical Prior Method for Estimating Purchase Intentions. R. H. CROUSE, RAY A. DECORMIER, Central Connecticut State University 490

Developing a PC-Based System for Generating RDD Numbers. BOB S. HODGES III, George Washington University 497

XIX. STATISTICS IN THE PETROLEUM INDUSTRY

Organizer: PAUL G. WAKIM, American Petroleum Institute
Chair: EDWARD GBUR, University of Arkansas

The Incidence of Naturally Occurring Radioactive Material (NORM) in Oil and Gas Production and Processing Equipment in the United States. GORDON H. OTTO, University of Houston 500

Two Substitution Methods for the EIA-782B Petroleum Survey. PEDRO J. SAAVEDRA, Macro Systems 506

Statistical Methods for Environmental Assessments at Petrochemical Facilities. ERIC R. ZIEGEL, Amoco Corporation 511

Exposure Indices Consideration for Rural Ozone Relationships in the United States. E. HENRY LEE, NSI Technology Services Corporation; DAVID T. TINGEY, WILLIAM E. HOGSETT, U.S. Environmental Protection Agency 517

Temperature-Adjusted Ozone Trends Based on Regression Residuals. PAUL G. WAKIM, American Petroleum Institute 523

XX. TOPICS IN DECISION THEORY

Chair: WILLIAM W. DAVIS, U.S. Bureau of the Census

Statistical Distance Measures in Generalized Gamma Classification. MARVIN YABLON, City University of New York, John Jay College of Criminal Justice 529

A Likelihood Ratio Estimation of the Non-informative Prior. MEHDI MOSTAGHIMI, Southern Connecticut State University 535

A Comparison of Stein and Lindley Rules. JAMES P. BOYLE, ROBERT M. HOLMES, Navy Personnel R&D Center 541

Interface Among Statistics, Cybernetics and Expert Systems. MAHESH CHANDRA, Hofstra University; A. GHOSAL, Baruch College 545

Improved Curtailed Sampling Plans for NP-Control Charts. W. W. WILLIAMS, S. W. LOONEY, M. H. PETERS, Louisiana State University 549

XXI. TOPICS IN MODELING AND INFERENCE

Chair: MICHAEL W. HORRIGAN, Bureau of Labor Statistics

Ratio Estimation in LIFO Inventory Valuation. L. A. THIBODEAU, MELISSA WAGNER, Price Waterhouse 555

e in Mathematical Sciences. ALEXANDER BATHULA, Montgomery College; MOHAMMAD ABDUL QUASEM, Howard University 561

CONTRIBUTED PAPERS—POSTER SESSIONS

A Multiple-Input Transfer Function Model of Okun's Misery Index: An Empirical Test of the Maharishi Effect. KENNETH L. CAVANAUGH, Maharishi International University; KURLEIGH D. KING, Central Bank of Barbados; CEVAT ERTUNA, Memphis State University 565

How Fair Can Employers Be? ALI S. HADI, BRIAN JERSKY, Cornell University 571

Detrending in Granger-Causality Tests: A Reexamination. JONATHAN D. JONES, U.S. Treasury Department 577

The Use of Multiple Regression Analysis in Performance Appraisal of Task-Oriented Jobs. KRIS MOORE, CARLOS MOORE, CHARLA MOORE, Baylor University 580

Arbitration and the Queen Bee Syndrome. SHARON L. OSWALD, Auburn University; JOSEPH G. VANMETRE, University of Alabama at Birmingham 584

Using Classification and Regression Trees to Forecast Navy PCS Moves. CHESTER PABINIAK, ROBERT HOLMES, Navy Personnel R&D Center 589

Applications of Lattice Theory to Polynomial Regression Models. JULIO L. PEIXOTO, University of Houston 595

Adaptive Pseudo Lagrange Multiplier Tests. WILLIAM C. QUINN, Laurel, Maryland 601

On the Choice of Forecasting Models for Electricity Consumption. MUN SON, University of Vermont; MICHAEL LEACH, Green Mountain Power Corporation 607

SPONSORED BY THE BIOMETRICS SECTION, ENAR-WNAR, AND THE BUSINESS AND ECONOMIC STATISTICS SECTION OF ASA

I. CURRENT DEVELOPMENTS AND APPLICATIONS OF EMPIRICAL BAYES METHODOLOGY

Organizer: NICHOLAS LANGE, Broun University
Chair: ROGER S. DAY, University of Pittsburgh

Smoothing the Non-Parametric Estimate of a Prior Distribution by Roughness: A Computational Study. NAN M. LAIRD, Harvard University, THOMAS A. LOUIS, University of Minnesota 613

SPONSORED BY THE GOVERNMENT STATISTICS SECTION AND THE BUSINESS AND ECONOMIC STATISTICS SECTION OF ASA

I. ACCESS TO FEDERAL STATISTICS—ISSUES FOR THE 1990'S

Chair/Organizer: PATRICIA BECKER, APB Associates, Inc.

Outreach for Products—The Census Bureau's CAPP Program. KURT R. METZGER, U.S. Bureau of the Census 621

PAPERS PRESENTED BY THE INTERNAL REVENUE SERVICE SPONSORED BY THE ASA SECTION ON SURVEY RESEARCH METHODS

Using Supplementary Information to Investigate Nonresponse Bias. LOUISE WOODBURN, Internal Revenue Service, STEVE HEERINGA, University of Michigan 625

1979 Occupation Coding Study/1979–1984 Mortality Study. BOBBY CLARK, DODIE RILEY, PETER SAILER, Internal Revenue Service 631

The 1985 Sales of Capital Assets Study. DAN HOLIK, SUSAN HOSTETTER, JOHN LABATE, Internal Revenue Service 638

Analyzing the Weighting Strategy for the Statistics of Income 1987 Estate Study. BARRY JOHNSON, LOUISE WOODBURN, Internal Revenue Service 643

The IRS Test Call Program. MARY BATCHER, FRITZ SCHEUREN, Internal Revenue Service 648

Evaluating Sample Design Modifications: Balancing Multiple Objectives. SUSAN HINKINS, FRITZ SCHEUREN, Internal Revenue Service 654

Partnerships, Passive Losses, and Tax Reform. SUSAN NELSON, Department of the Treasury, TOM PETSKA, Internal Revenue Service 659

Nonprofit Charitable Organizations: A Decade of Change (1975–1985). SUSAN J. MAHLER, DANIEL F. SKELLY, Internal Revenue Service 635

Corporate Industry Coding. ALLISON CLARK, Internal Revenue Service 671

INDEX OF PARTICIPANTS 677